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ABSTRACT

This guide provides information on preparing students in grades 4-10 for field trips and describes possible field trip sites in the northeastern, mid-eastern, and southeastern regions of North Carolina. Selected sites in the northeastern region (from Roanoke Island to Ocracoke) include the Dare Coastline and Cape Hatteras National Seashore. Selected sites in the mid-eastern region (between the Pamlico River and the New River Inlet) include the Marine Resources Center, Fort Macon State Park, Croatan National Forest, and Cape Lookout National Seashore. Selected sites in the southeastern region (from the mouth of the Cape Fear River, north to the New River Inlet) include Fort Fisher Ferry Landing and Carolina Beach State Park. Also provided is information on parks and services and (in an appendix): (1) a map indicating natural resources interpretive facilities; (2) cross-section diagrams of northeastern and southern North Carolina coasts; and (3) lists of vegetation found in such coastal habitats and ecosystems as dunes, maritime shrub thickets, maritime forests, salt marshes, freshwater coastal marshes, and cyprus swamps. (JN)

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Coastal Awareness in Public Education
PROJECT Cape

A GUIDE TO FIELD TRIP SITES IN COASTAL NORTH CAROLINA

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PREFACE

The people of North Carolina are blessed with an abundance of natural resources. Our state is very much concerned with maintaining several unique natural areas for the benefit of the public. Local and federal governmental agencies have also preserved many sites in North Carolina.

Educational groups are especially welcomed by the interpretive facilities. The teacher or youth leader who is concerned with a study of the natural sciences, at any level, would be amiss if these opportunities for true "first hand" experiences were neglected. The time spent in advance preparation seems much more worthwhile when you feel the sense of excitement and anticipation at the prospect of "going there!"

The purpose of this resource is to introduce to teachers and community youth group leaders the various opportunities for studying our coastal environment: where to go, what you will find, what to expect and who to contact for help.

Welcome to the coast! The contributors to this publication hope that you and your young people will find enjoyment in visiting and studying our coastal region's natural resources.

--Carolyn H. Hampton

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PREPARATION FOR FIELD TRIPS

Personal Touches

All of us have had some experiences which we would like to share with our students or youth group. The field trip is an occasion full of opportunities for such sharing. This is the time to get dirty, scrabbling in the sand and mud, sharing nature at it's best and exchanging stories and experiences with young people. Most groups will be accompanied by one or two people who have had some experinece with the areas being visited. Invite them to add their personal touches whenever appropriate.

Scheduling

The proper timing is of utmost importance when making plans to visit the coast. Timing can make the difference between success and disaster, so consider this factor well.

The best season to plan a trip is during the warm months of the year. Late spring, summer and fall, right up to the first frost, are the most productive periods. Fall and spring migrations of bird life and the blooming of wildflowers are very much attuned to changes in the weather. Other wildlife are also affected by seasonal weather. Noxious insects thrive during the summer and fall. Be prepared for biting insects.

If visiting a tidal flat or any part of the water influenced areas, try to arrange your time around the tides. Local wind conditions will greatly influence the extent of the tidal fluctuations along the coast. The animals are influenced by the tides and there is usually more activity during the incoming tides. The best time to visit jetties, salt marshes and mudflats is at low tide when larger areas will be uncovered.

The total length of time that can be spent on a field trip should be considered when allotting time for each activity. When spending only one day, activities should be chosen for brevity and effectiveness and the area chosen should give the most opportunities with the least amount of travel.

When possible, try to arrange a weekend or full week for camping. There are recreational areas located all along the coast and most of them will be pleased to help arrange an area to enable the group to camp together. Quite a few of the areas will even allow camping free of charge when they are given advance notice of the trip.

If you are fortunate enough to have a couple of days at the coast, plan at least one night-time visit to a tidal flat. The difference in the life forms and the abundance of them is astounding at night. Also, fishing with nets or gigs is more productive at night. You might be able to catch your supper!

People

We are proud to say that some of the friendliest people live on the North Carolina coast. Natives are always glad to help find an area which might fit a particular activity, or give suggestions about where to find a particularly good fishing spot. Quite a few of the "old timers" will entertain with a colorful tale or two about the history of their section of the coast.

Information

People are the best sources. Each recreational area has someone who specializes in helping you. Since they are expected to be good hosts, remember to be good guests. Give them advance notice, whenever possible, so they can be better prepared to serve you.

Literature

The park office, tourist bureaus and chamber of commerce offices usually provide free information in the form of pamphlets and also have publications for sale at a reasonable cost.

Comfort

Whether staying for one day or several, this is one of the considerations which must be made. Most of the parks have comfort stations and these facilities are mentioned for each area described. Come prepared for extremes since the coastal area is exposed to the elements. Though there are generally warm temperatures during the winter, the sun and wind can combine to make conditions very uncomfortable for those who are unprepared. Even during the warm months it is necessary to provide protection against the sun and wind. Long pants, long sleeved shirts, tennis shoes and a hat will prevent sun and wind-burns to exposed skin. Remember, a field trip is not the time to get a tan! If tender skin does suffer from exposure, use a first aid that will provide healing action. One suggestion for this problem is a lotion combined of the juices of the Aloe vera (medicine plant) with vitamin E. For extreme burns consult a doctor; there is nothing amusing about sunburn or sun poisoning.

As in any outdoor area, you will be exposed to mosquitoes, biting flies, ticks, chiggers, etc. A good repellent applied to the cuffs, collar and belt line will prove most effective in the prevention of these discomforts.

To be on the safe side, always include a complete change of clothing for the return trip.

"Beasties"

The coastal forests are well populated with snakes, bees and other noxious creatures. An encounter is always a possibility; come prepared to deal with these as they arise. Use a good measure of common sense when dealing with those creatures who may protect themselves with a bite and/or sting. Do not expose yourself to unnecessary risks. Here are a few suggestions for dealing with a situation when it does arise:

Snake bite: The best advice is to seek medical help immediately. Be sure to either kill the snake and carry it with you to the doctor or remain calm enough to provide an accurate description to aid in the treatment of the snake bite victim. Keep the victim calm and apply cold packs to the bite area as a first aid measure. Snake bites are rarely fatal if medical help is obtained within an hour.

Insect bites or stings: Apply a disinfectant to the immediate area and a topical anesthetic such as Sting-foe. For those who are allergic, a doctor's attention is advised.

First Aid: A good first aid kit is an absolute necessity. DO NOT LEAVE HOME WITHOUT IT!

PARKS AND SERVICES

Quite a large number of insitutions provide good host services to visiting groups. They will be happy to aid in planning a trip and some will even make their facilities available if sufficient notice is given.

Marine Resources Centers

The Department of Administration, Office of Marine Affairs maintains three centers along the coast of North Carolina. These are located in Manteo, Atlantic Beach and Kure Beach. Each of these centers provide public aquaria, touch tables, exhibits, films, lectures and special programs. If arrangements have been made in advance, laboratory facilities, field trips and special seminars can be made available. Do not miss the opportunity if you are in the area. Write or call for information.

Marine Resources Center/Roanoke Island
P. O. Box 967
Manteo, North Carolina 27954
(919) 473-3493

Marine Resources Center/Bogue Banks
Atlantic Beach, North Carolina 28512
(919) 726-0121

Marine Resources Center/Fort Fisher
General Delivery
Kure Beach, North Carolina 28449
(919) 458-8257

National Park Service

The U.S. Department of the Interior operates two national seashores in North Carolina. The Cape Lookout National Seashore is managed by a facility at P.O. Box 690, Beaufort, North Carolina, 28516. The Cape Hatteras National Seashore is managed by a facility located in Manteo, North Carolina. The parks within this system maintain

several camping areas and information centers. The camping areas have different opening dates. Call ahead for the schedule. When planning a trip to this area, arrangements may be made through the Park Service, Route 1, Box 675, Manteo, North Carolina or call (919) 473-2111.

Services offered are nature trails, ranger-led field trips, camping, museums, environmental study areas and many more too numerous to mention.

United States Forest Service

The Croatan National Forest is operated by the U.S. Department of Agriculture, Forest Service. This forest has recreational hiking trails, camping, wildlife and forestry programs and many features of interest. For information contact the Ranger's Station at Croatan National Forest, 435 Thurmon Road, New Bern, North Carolina or call (919) 638-5628.

State Parks

The Department of Natural Resources and Community Development, Division of Parks and Recreation, operates several parks in the coastal region. Write or call for information.

Jockey's Ridge State Park
P. O. Box 592 (919) 441-7132
Nags Head, North Carolina 27959

Fort Macon State Park
P. O. Box 127 (919) 726-3775
Atlantic Beach, North Carolina 28512

Carolina Beach State Park
P. O. Box 457 (919) 458-8206
Carolina Beach, North Carolina 28428

NORTHEASTERN REGION SITE DESCRIPTIONS

This area includes the famous Dare Coastline, from Roanoke Island to Ocracoke. This is an area richly endowed with the history of the early settlement and growth of our state and nation. There are many sites for seaside excursions.

Roanoke Island

The island is the site of many historical landmarks and several features of interest to a biology class. The Fort Raleigh National Historic Site is a good place to begin a visit to this area. The Site is maintained by the Cape Hatteras National Seashore, Route 1, Box 675, Manteo, North Carolina.

The Lindsay Warren Visitor Center is a museum with exhibits and programs relating to the story of Fort Raleigh. The Thomas Hariot Nature Trail is a self-guided walk through a mixed hardwood--pine forest. During the summer, the Park Rangers bring the forest to life with their protrayals of the colonists' life. Indian lifestyles are also illustrated along the nature trail.

Next to Fort Raleigh is the imaginative 16th century style Elizabethan Gardens. Created by the Garden Club of North Carolina, the Garden is a memorial to the poeple of Sir Walter Raleigh's ill-fated "Lost Colony."

The Roanoke Island Historical Association presents the Joe Layton production of Paul Green's drama "The Lost Colony." The outdoor drama is presented nightly, except Sunday, from mid-June until late August. Tickets and reservations are available at the box office.

Marine Resources Center

This facility offers year-round programs in the arts and crafts of the area as well as laboratory facilities, films, seminars and public aquaria. Contact the Center for field trips to the surrounding water-land interface. There are many programs from which you may choose. The address is Marine Resources Center/Roanoke Island, P. O. Box 967, Manteo, North Carolina 27954 or call (919) 473-3493.

Wright Brothers National Memorial

Kitty Hawk and Kill Devil Hills were the sites of the first powered flight experiments by Wilbur and Orville Wright. This site is dedicated to their efforts. A stop at the visitor center will provide exhibits and seminars on the subject. Kill Devil Hill is the site of the Wright Memorial Monument. This hill was once a shifting dune before stabilization of the sands. Perhaps this would be useful in comparing erosion to the nearby Jockey's Ridge State Park. The Wright Brothers Memorial is maintained by the Cape Hatteras National Seashore.

Jockey's Ridge State Park

This park's claim to fame is the huge dune which attracts thousands of visitors a day. The dune is a classic example of the effect of wind and sand and makes an excellent spot to study wind erosion in the area. The perimeter of the park is occupied by a community of shrubs and other stabilizing plants which have been kept in their natural state as much as possible.

Hang gliders and kite fliers will also enjoy this site because of the updrafts created by the heating of the bare sand. Study the regions between the dunes as an example of communities which are in transition to seek more stable conditions.

The address for Jockey's Ridge State Park is P. O. Box 592, Nags Head, North Carolina 27959 or call (919) 441-7132.

Nags Head Woods

Just a quarter mile from the ocean, there is a hardwood forest of tall pine, oak and hickory scattered with freshwater ponds and includes dunes and saltmarsh. Nags Head Woods is managed by the North Carolina Nature Conservancy. In flora and fauna, Nags Head Woods is one of the most diverse forests on the Atlantic coast. Large specimens of American Holly, Dogwood, Hop Hornbeam, Live Oak and Pignut Hickory are found in the woods. It is the northern limit of the Green Orchid and the southern limit of Wooly Beach Heather. To arrange a tour of this unique habitat, call the ranger-in-residence at (919) 473-5282.

Bridges and Causeways

Many of the more interesting sites in the area are located along the bridges and causeways. Parking is usually available close enough to the marshes and inlets to allow easy access. Some of the recommended sites would be the Oregon Inlet bridge and Hatteras Inlet.

Pea Island National Wildlife Refuge

For the best in bird observation, be sure to visit this area. The refuge headquarters is about ten miles south of Oregon Inlet and is operated by the U.S. Fish and Wildlife Service, phone (919) 987-2394. During the fall and winter migration period, thousands of birds overwinter in this refuge. Observation decks are usually crowded with photographers taking advantage of such a rich opportunity.

The sound side provides salt flats, rainwater ponds and the best bird observation. Yaupon, Myrtle and Pond Pine groves occupy the higher

parts of the salt marsh here. The guide will also be interested in the extensive dune system on the ocean side.

Cape Hatteras National Seashore

This rather large area is controlled by the National Park Service with headquarters at Route 1, Box 675, Manteo, North Carolina 27954. This is the place to contact for long-range plans, information and reservations for groups. No fee is charged for educational groups.

Bodie Island

Located south of Nags Head on Highway 12, there are several sites available. Bodie Island Visitor Center provides information about camping, recreation, museums, bird-viewing trails and the lighthouse. The Sand Castle is a children's activity center specializing in crafts, fun time with a ranger and a wind generator. Coquina Beach has picnicking, showers and lifeguarded beaches. During the summer park rangers provide many activities such as bird walks, canoe trips, historical tours, beach walks and marshmallow roasts.

Salvo Campground

This campground is located twenty miles from Oregon Inlet and is ideal for group camping. Open areas are provided free of charge to educational groups. The availability of showers and restrooms make this a comfortable spot to camp. This area is exposed to high winds, however, so sturdy tents and extra-long tent stakes should be used. Be prepared to battle or avoid the insects. Mosquitoes are not in a short supply here!

The rangers will be cooperative in giving a great variety of lessons on enjoying and appreciating this section of the Outer Banks.

Cape Hatteras Lighthouse

This historic lighthouse is the tallest in the United States. The lighthouse is usually open during daylight hours, however, recent erosion problems may cause a change in this practice. Contact the Park headquarters for details. The visitor center at the Lighthouse has a continual program for people of all ages. Crafts, exhibits and seminars are but a sample of the offerings. Several hours should be allotted for the activities found here.

Camping and nature trails are provided in this area. Plan your visit well in advance because this is one of the most popular spots in the Cape Hatteras National Seashore.

Erosion projects may be studied along the sand bar. The extensive dune system and maritime forest will provide classes with areas for study.

Ocracoke Island

The free ferry may be taken across the Inlet to Ocracoke Island. The remoteness of the Outer Banks is felt as one travels Highway 12 to Ocracoke village. If you wish to make a transect of the Island along this section, be sure to park in the areas provided.

The campgrounds on Ocracoke are open year-round. Primitive camping is available, but the village of Ocracoke provides stores for supplies.

Toll Ferry

Ferries operate between Ocracoke and Cedar Island (2½ hours) and Ocracoke and Swanquarter (2 hours). Ferry schedules should be checked well in advance. Reservations are required and can be made by calling Ocracoke (919) 928-3841 or Cedar Island (919) 225-2551.

Information required to be given will be the number of vehicles, length and type as well as the expected number of passengers. Charges are made according to total weight.

MID-EASTERN REGION SITE DESCRIPTIONS

This region includes coastal areas between the Pamlico River and the New River Inlet.

Marine Resources Center

This facility is situated in the Theodore Roosevelt Natural Area near Pine Knoll Shores. It is centrally located and would make an excellent starting point for a field trip.

The Resources Center may be contacted by writing Marine Resources Center/Bogue Banks, Atlantic Beach, North Carolina 28512 or by calling (919) 726-0121. This public aquarium is open year round and on weekends.

The aquariums and touch tables are well-stocked with fascinating specimens of sea life. The educational seminars and films that are offered by the center may be advantageous. If the center is notified in advance, an arts and crafts session, use of the laboratory facilities or a staff-guided walk through the nature trail can be scheduled. The trail meanders through a maritime forest in its climax stage. Salt marshes, rain-water ponds and cypress swamps make this trail useful in the study of a climax dune forest.

The nearby sound may be studied during fair weather. The bottom has many types of habitats ranging from soft mud bottoms to oyster beds and eel grass beds. A narrow marsh lines the shore. The wildlife in this area includes many shore birds, alligators, snakes and an occasional raccoon. Be prepared for biting insects during the warm season.

Fort Macon State Park

This park is located on the eastern end of Bogue Banks near Morehead City. The fort was a Confederate bastion that guarded the Beaufort Inlet during the Civil War. The site is presently being restored for its historical value. The two areas that are maintained are a public beach and the historical area.

The public beach offers an opportunity for a seaside romp in a well-guarded area. If you plan to include swimming as a part of the day's activities, this area has lifeguards only part of the year. Never swim when the lifeguard is off duty as this area may have some treacherous currents.

For the naturalist, this section of the park is a classic example of the open beach with fore dune, swash zone and a gradual build-up to the climax forest. Please respect the rules concerning food and drink on the beach.

An illustrated trail is located in the historical section of the park. This trail has many attractive features such as Spanish Bayonet Yucca and Yaupon.

A series of jetties have been erected by the Army Corps of Engineers to control the movement of the sand in the inlet. Swimming is not permitted in this section of the park. These jetties may be used in a variety of studies.

Vertical zonation is best observed on the end of the jetty which extends the furthest into the ocean. This jetty is best approached from the beach. These rocks are quite slippery. Use extreme caution. Echinoderms, anemones, bryzoa and other attached forms of life are common here. The spaces between the rocks also have a unique community associated with them.

Croatan National Forest

This forest is managed by the United States Department of Agriculture, National Forest Service. Headquarters is located on Highway 70 about five miles south of New Bern. The address is US Forest Service, 435 Thurmon Road, New Bern, North Carolina 28560 or call (919) 638-5862. The office hours are 8:00 - 4:30 Monday through Friday. Stop and take advantage of the free brochures about the National Forest and Croatan.

This National Forest is bound on the north by New Bern and Newport. The southern boundaries lie between Maysville and Swansboro. This large area encloses one of the most variable topographies and ecological regions in eastern North Carolina.

Mysterious lakes and unusual pocosins may be visited. Endangered birds and wildlife can be spotted. Forest management in many forms can be observed in this area. Also, camping, hiking trails, swimming and excellent boating facilities are provided.

You may want to take advantage of the camping facilities available throughout the Forest.

Neuse River Recreation Area - Full service area has tent and trailer sites. Water, restrooms, trailer dump site, shower, picnic area, hiking trails and swimming area are available.

Cedar Point - Located near Swansboro, primitive camping with fresh water, pit and chemical type restrooms. Boating and hiking available with added attraction of nearby Emerald Isle.

Fisher's Landing - Located outside of New Bern, a facility designed with large groups in mind. Primitive camping with hand-pumped fresh water and chemical toilets. Swimming area and hiking trails available.

Since timber is a big business in this area, Croatan has an excellent timber management program in progress. If interested in

observing these activities, contact the Ranger Station to find out exact locations.

Wild and scenic areas are located throughtout the Forest. The pocosins around Great Lake and Catfish Lake provide refuge for large populations of wildlife and waterfowl such as deer, bear, raccoons, oppossums, muskrats, nutria and other furbearers, ducks, Osprey, Wild Turkeys, hawks, owls and song birds. Reptiles such as the American Alligator, Rattlesnakes, Moccosins and their harmless cousins are a common sight. The unusual Anolis carolinensis or American Chameleon is found in the moist forests. Amphibians are also well represented here. There are mudpuppies (Necturus), salamanders and a great variety of frogs and toads. Management programs include birds of special concern such as the Red Cockaded Woodpecker, Wood Duck and Osprey.

Many rare plants are found here. Wildflowers line the roads and ditches and the boggy areas are inhabited by carnivorous species such as Venus Flytraps, Pitcher Plants, Trumpets, Sundews, Butterworts and Bladderworts.

Climax forests may be visited at Fisher's Landing, Island Creek Walkway, Neuse River Recreation Area and Cedar Point. Pine plantations may be viewed at Cedar Point, Pine Cliffs and Brices Creek area. Longleaf Pine, Turkey Oak and Wiregrass communities are located along Highway 24 and in the Newport/Swansboro area.

Cedar Island National Wildlife Refuge

This refuge is managed by the United States Fish and Wildlife Service. For information concerning tours and outdoor education, contact Cedar Island NWR, Cedar Island 28520 or call (919) 225-2511.

The refuge is located 40 miles northeast of Beaufort (take Highway 70 to Highway 12, the entrance is on the Lola Road).

Few public facilities are available due to the lack of development. Public roads provide easy access for wildlife observation. Maps and leaflets describing these roads are available at headquarters. Two boat landings are available at the Thorogare Bay Bridge and Lewis Creek for those who wish to use a boat.

The 7.8 acres of land occupied by the refuge is mainly salt marsh dominated by Black Needlerush, Cordgrass, Saltgrass and Switchgrass. Woodland areas are populated with Loblolly Pine, Longleaf Pine and Pond Pine with a good number of Live Oaks and other hardwoods.

Throughout the year there are large numbers of waterfowl and marsh birds that inhabit the area. The marshes are also home to amphibians, reptiles and mammals. Upland areas support populations of deer, raccoon, otter, mink, rabbits and rodents. Raptoral birds include Great Horned Owls, Red-tailed and Marsh Hawks and Osprey. Songbirds are common during migrations.

Hampton Mariner's Museum

This museum is located on the waterfront of historic Beaufort, North Carolina. The general theme of the museum exhibits deals with ships and ship building. Programs in marine history from the revolutionary period to the present are offered. Ship models and watercraft shows are an intergral part of the activities.

Extensive field trips to tidal flats, island dunes and salt marshes provide fun to people of all ages. During the summer, the museum presents a Summer Science School for interested visitors. To arrange trips, contact

the curator at 120 Turner Street, Beaufort, North Carolina 28516 or call (919) 728-7317.

Cape Lookout National Seashore

This park is administered by the National Park Service, P. O. Box 690, Beaufort, North Carolina 28516. The park includes Shackleford Banks, Core Banks and Portsmouth Island. The famous Cape Lookout Lighthouse is located on the bight.

The park is accessible only by boat or ferry and there are no developed roads within the park. Ferries run from Harkers Island to Cape Lookout, from Davis on Highway 70 to Shingle Point and from Atlantic to Core Banks north of Drum Inlet.

This park is being maintained in its natural state as much as possible. Visitors should come prepared to "rough it" for a while. It is the perfect place for a small group camping trip. Be sure to come properly prepared! This section of the Outer Banks provides little shelter. Proper preparation should include water, food and shelter. If additional fresh water is needed, it can be acquired by digging about three feet down anywhere on the Banks.

Mosquitoes and biting flies are found along with ticks and chiggers. Be sure to bring insect netting and repellent. Check yourself daily for ticks and do not let a few hardships discourage you. The experiences will make up for the discomforts!

These barrier islands are constantly on the move as they are exposed to constant wind and water action. The plant communities reflect this continuing battle against erosion. Few places are more than a few feet above high tide. Stay alert for possible storm surges which

may inundate the exposed campsite. Portsmouth Village, Shackleford Banks or Guthries Hummock are the few areas with groves of trees.

The vegetation consists of Sea Oats, Pennywort, dune grasses, Sea Rocket, Salicornia, Jerusalem Cherry, cacti and Marsh Elder. Forests are populated with Live Oak, Red Cedar, Juniper, Pond Pine, Loblolly Pine, Hop Hornbeam and Hercules Club. Understory plants will include Yaupon, Dogwood, Beautyberry and Palmetto. Vines are everywhere including Smilax, Virginia Creeper, Peppervine and Poison Oak.

Shackleford's maritime forest is well worth the hike required to view it. If you can locate a section of good high ground, you will find the traveling easier. Livestock trails can be followed to the ocean side. Occasional herds of cows, ponies, goats or sheep may also be seen. These animals have become feral so be cautious around them. Squirrels, rabbits and rodents may inhabit the area along with raccoons.

The forest will have huge trees which testify to the age of this section. A local saying has it that a live oak lives for two hundred years and dies for a hundred. In the middle of the forest, you can locate a wide trail which runs the length of the island and can be followed to the dune system. Be sure to mark the trail entrance and return since it is very easy to lose the point of reference.

The dunes offer a most breath-taking sight of a ghost forest filled with tree skeletons. They are filled, however, with livestock and wild animals. Many birds are found there such as gulls, Brown Pelicans, terns and Killdeer. Do not be shocked when a bird tries to frighten you with mock attacks. It is only trying to protect its nest. Tree frogs and toads inhabit these woods along with Skinks, Anoles and Glass Lizards (legless lizards). Black snakes, Water snakes, Rat snakes

and a few tree snakes are found but no poisonous snakes. Sea turtles, Box Terrapins and Mud Snappers are occasionally spotted.

Insects include Cicadas, biting flies, house flies, mosquitoes, Carpenter and Fire Ants. When gathering dead wood for a fire, be careful not to disturb mounds of dirt which may harbor Fire Ants.

Shell gathering is unequal on the ocean beach and dunes. The marshes, flats and sand bars all combine to make a trip not soon forgotten.

This region includes the mouth of the Cape Fear River, north to the New River Inlet.

Fort Fisher Ferry Landing

This boat ramp is located by the ferry landing at Kure Beach. It may be approached by taking Highway 421 south of Wilmington. The area is ideally situated on the estuary of the Cape Fear with the Atlantic Ocean and Corncake Inlet on the southern extreme. The boat landing is maintained by the North Carolina Wildlife Department.

This section is very much under the influence of wind and water. A breakwater jetty extends down the river side to control the movement of sand. The dunes, however, are obviously in a state of constant change, as they show very little evidence of proceeding to the climax forest stage.

The dunes are broken only occasionally by Myrtle and Live Oak with large areas of pioneer grasses and Sea Oats being the most common feature. On the ocean side, there is a great deal of erosion that is influencing the site.

The lagoon formed by the inlet and jetty is covered on all edges by a well-developed salt marsh showing most types of zonation. The most extensive development of the marsh is at the end of the jetty where a marsh island has develped. At low tide, the lagoon is very shallow and easily waded. The mudflat is rarely uncovered even on the lowest tides. This makes an excellent spot for the study of burrowing animals and shell collecting.

The jetty itself makes a good focal point for an investigation. It is covered with many forms of life common to hard surfaces. On the lagoon side, the rocks are covered with patches of oysters and anemones. Crabs, Sea Stars and Blennies occupy the crevices in the jetty. The estuary side of the jetty is covered with an entirely different community consisting mainly of barnacles and organisms associated with them.

North Carolina Marine Resources Center/Fort Fisher

The Center is located at Fort Fisher, just south of Kure and Carolina Beaches on Highway 421. The Center houses aquaria, exhibits, classrooms and research laboratories. Contact the Center for field trips to surrounding waters. The address is Marine Resources Center/ Fort Fisher, General Delivery, Kure Beach, North Carolina 28449 or call (919) 458-8257.

Carolina Beach State Park

This park is located off Highway 421. After crossing the bridge going toward Carolina Beach, signs will direct you to the park.

The park is well developed with camp sites, trails and docking facilities available. The marina snack bar has literature and information about the park. Interpretive sessions may be scheduled in advance by calling (919) 458-8206.

Marked trails carry hikers through pine, oak and myrtle forests, dunes, rain-water ponds and swamps. Xeritic communities are found in the exposed areas and insectivorous plants can be seen here.

Do plan to visit this unique park, but be prepared. Along with the beautiful and interesting biota, there are large numbers of biting

insects such as mosquitoes, biting flies and gnats. Bring plenty of protection!

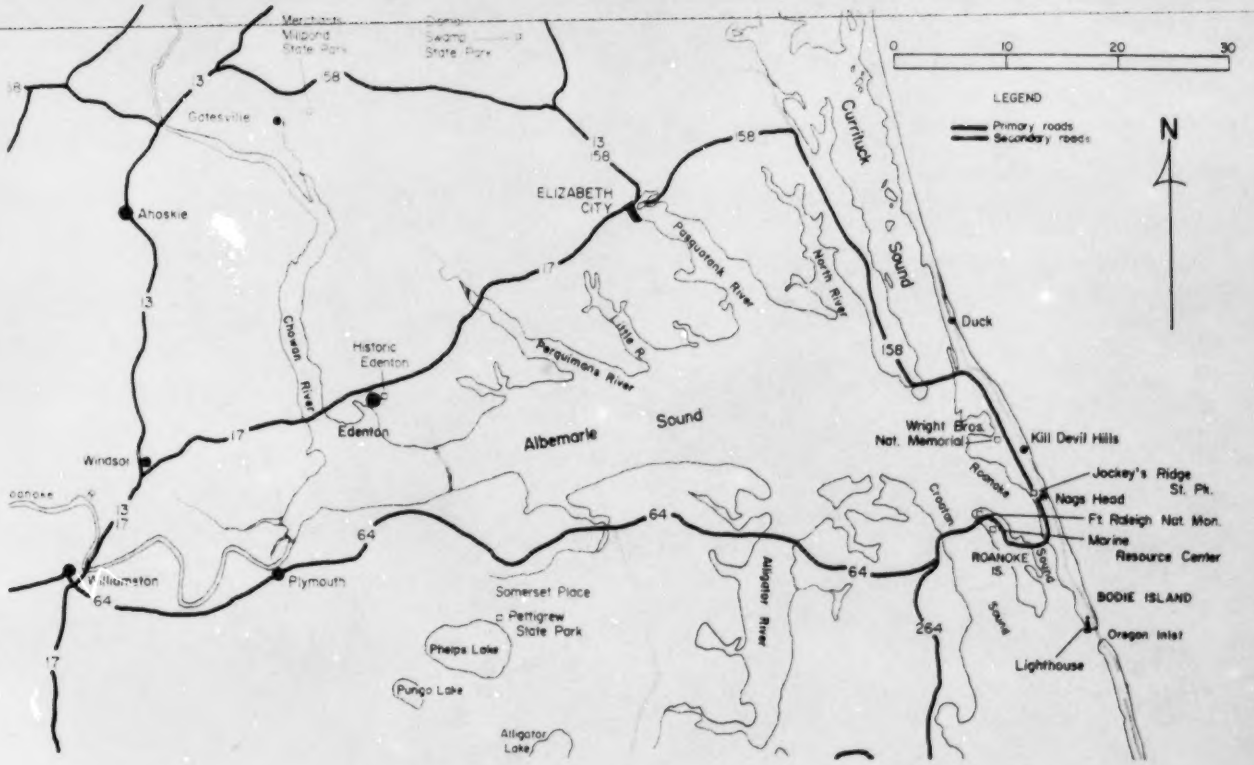
Fort Fisher State Historic Site

This facility is managed by the Department of Cultural Resources. This historic site maintains the earthworks of Fort Fisher used in a Civil War land and sea battle.

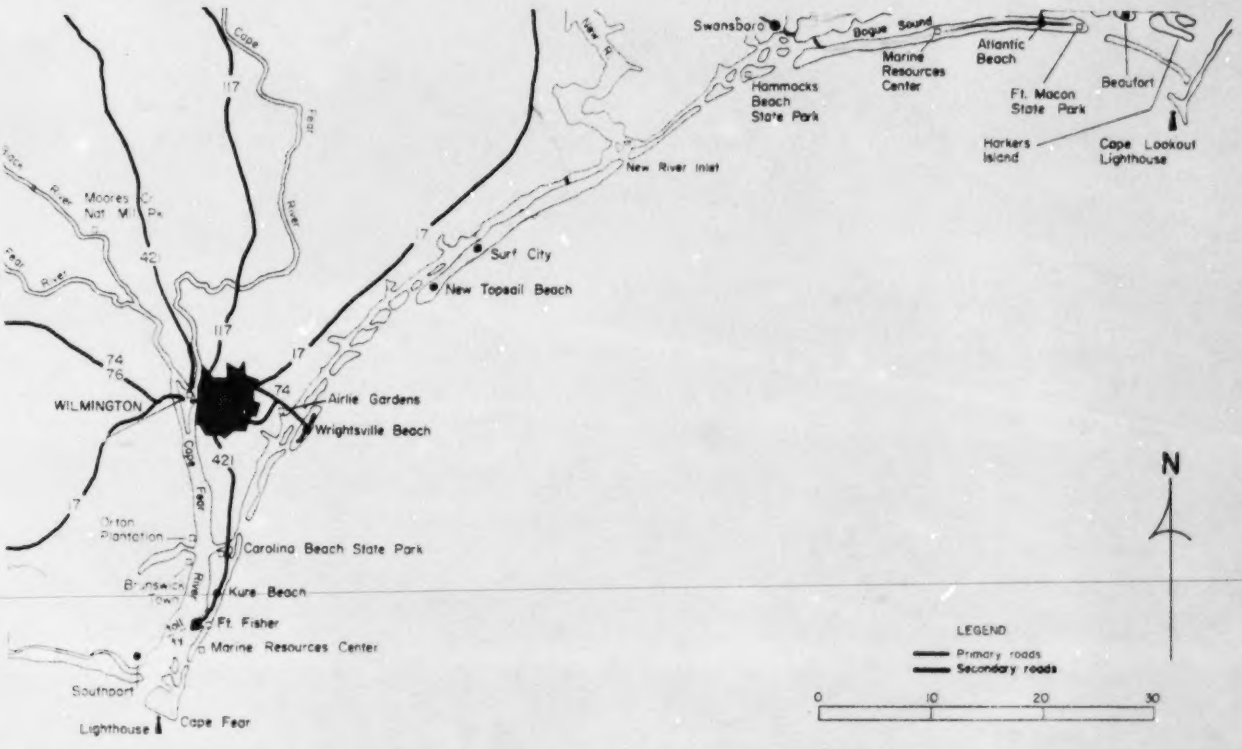
Across the highway from the museum is North Carolina's only natural rocky outcrop on the coast. These rocks are of coquina limestone (cemented Pleistocene shells) and are usually only visible at low tide. Typcial organisms found are sea urchins, starfish, barnacles, crabs, anemones and several varities of seaweed.

APPENDIX

Northeastern Region Marine Interpretive Facilities



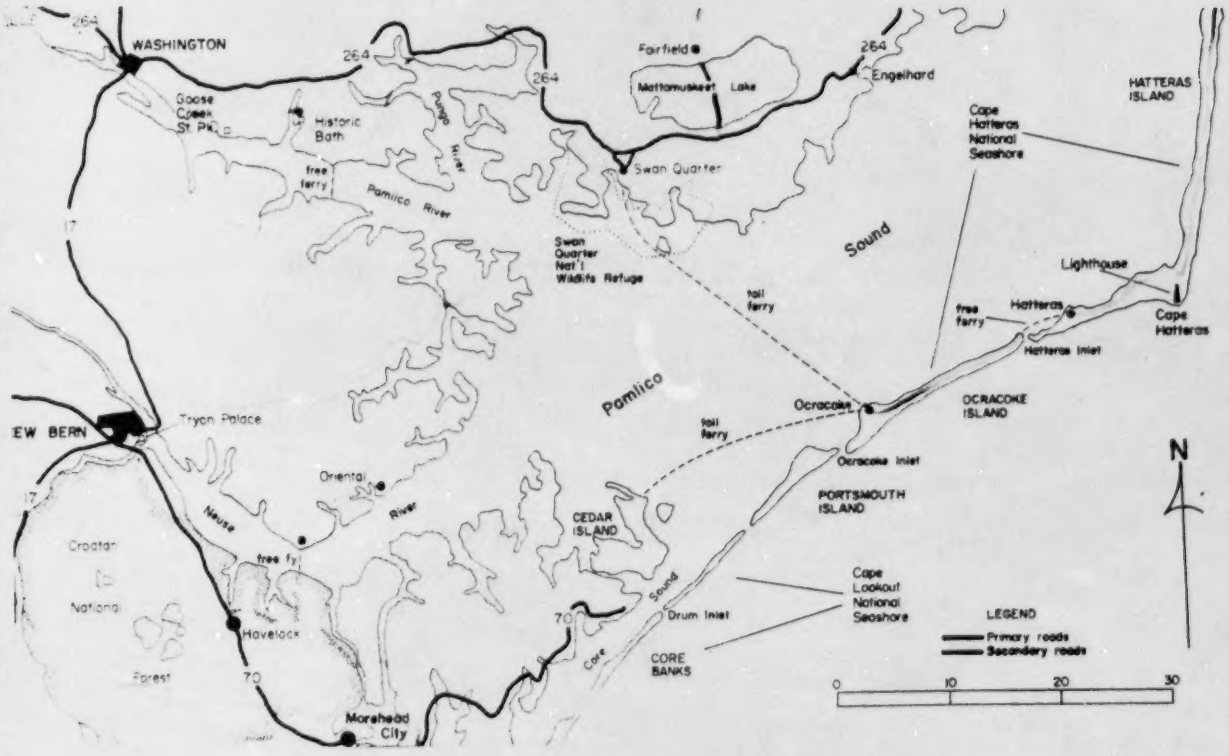
Southeastern Region Marine Interpretive Facilities



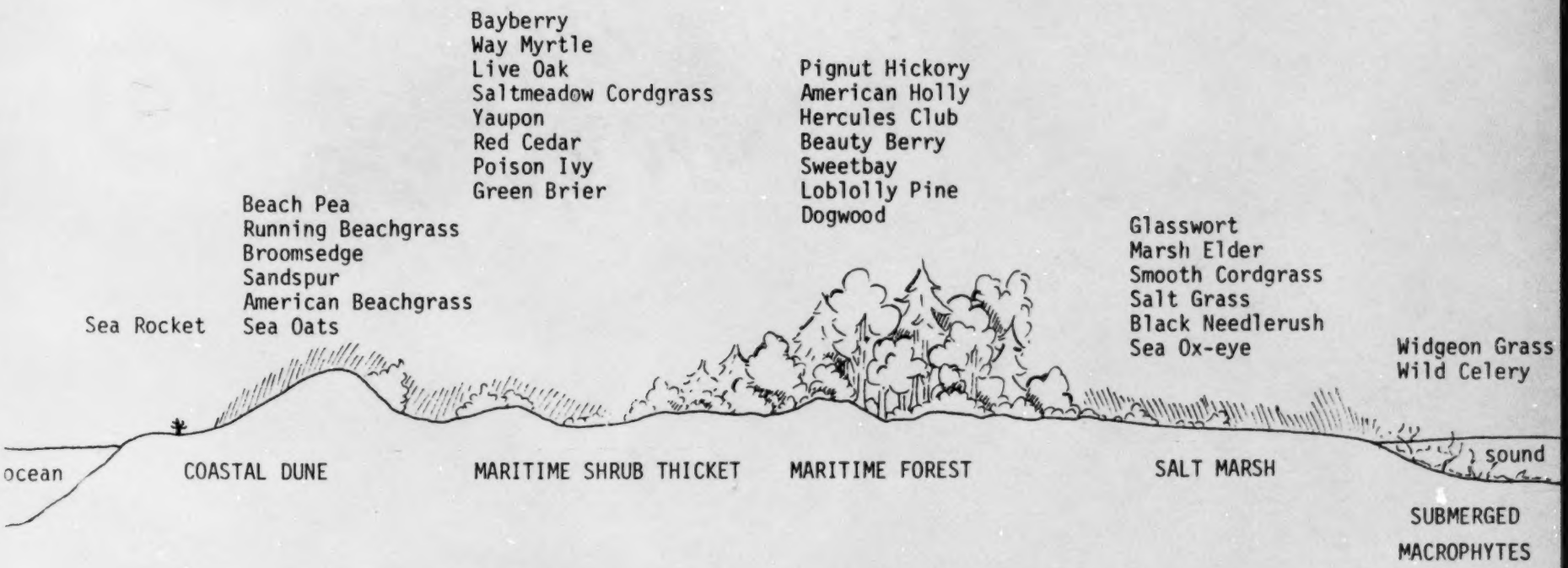
Maps from;

Vacation and weather guide to coastal North Carolina. UNC-SG-79-02.

Central Region Marine Interpretive Facilities



GENERALIZED CROSS SECTION OF NORTHEASTERN NORTH CAROLINA COAST



Original development by Steve Benton and Kurt Getsinger

GENERALIZED CROSS SECTION OF SOUTHEASTERN NORTH CAROLINA COAST

Original development by Steve Benton and Kurt Geteinger

Coastal Dunes

This area extends from the ocean side of the frontal dunes inland to the smaller second and third row of dunes. The coastal dunes community is dominated by perennial grasses with shrubs and small stunted trees behind the dunes. Organisms of this community are exposed to harsh environmental factors: (1) winds carrying salt spray in the air and high substrate salinity, (2) wind and sand blast, (3) drought and high surface temperatures, and (4) low levels of nutrients, particularly nitrogen.

The organisms have adapted to these conditions by: (1) dune grasses and shrubs have deep root systems to reach the water table, (2) leaves are covered with waxy cuticle to prevent dessication, (3) dune grasses have leaves that bend with the wind, (4) many dune animals are nocturnal to avoid intense daytime heat and light, and (5) some animals are burrowers to escape surface temperatures.

Grasses:

Ammophila breviligulata	American beachgrass
Andropogon spp.	Broomsedge
Cenchrus tribuloides	Sandspur
Cyperus spp.	Sedges
Panicum amarulum	Silver bunchgrass
Panicum amarum	Running beachgrass
Spartina patens	Saltmeadow cordgrass
Triplasis purpurea	Purple sandgrass
Unicla panticulata	Sea oats

Forbs:

Cakile edentula	Sea rocket
Croton punctatus	Seaside croton
Euphorbia polygonifolia	Beach spurge
Oenothera laciniata	Evening primrose
Strophostyles helvola	Beach pea

Shrub:

Iva imbricata	Seashore elder

Maritime Shrub Thicket

The area behind the dune complex, composed of dense growth of low shrubs often tangled with climbing vines is known as the maritime shrub thicket. The high frontal dunes offer protection for back dunes. The first shrubs behind the dunes are level with the dunes and become progressively taller inland. The tops of the shrubs have been killed by salt spray and form a smooth compact surface.

Shrubs--Trees:

Baccharis halimifolia	Silverling
Ilex vomitoria	Yaupon
Iva frutescens	Marsh elder
Juniperus virginiana	Red cedar
Myrica cerifera	Common wax-myrtle
Quercus virginiana	Live oak
Rhus copallina	Shining sumac
Zanthoxylum clava-herculis	Hercules club

Vines:

Parthenocissus quinquefolia	Virginia creeper
Rhus toxicodendron	Poison ivy
Smilax ssp.	Green brier
Vitis	Wild grape

Maritime Forest

This area is directly behind the shrub thicket community composed of dense vegetation dominated by Live oak. Other species include Ameircan holly, Hercules club, Dogwood and Loblolly pine. The maritime forest also exhibits the shearing effect of wind-borne salt spray. The angle of the canopy is directly related to the quantity of salt spray received. Along the southern coast maritime forests are dominated by live oak. The maritime forest of the northern coast are composed of a more mixed deciduous forest.

Shrub--Tree:

Bumelia lycioides	Southern buckthorn
Osmanthus americanus	Wild olive
Callicarpa americana	Beauty berry
Xanthoxylum clava-herculis	Hercules club

Tree:

Carpinus caroliniana	American hornbeam
Ilex opaca	Amercian holly
Morus rubra	Red mulberry
Pinus taeda	Loblolly pine

Quercus laurifolia	Laurel oak
Quercus virginiana	Live oak
Carya globra	Pignut hickory
Cornus florida	Dogwood

Salt Marshes

There are two types of general types of salt marshes in North Carolina; regularly flooded marshes and irregularly flooded marshes. The regularly flooded marshes are flooded regularly twice daily by the ebb and flood of the tide. Regularly flooded marshes are most common in the southern part of the state, from Cape Lookout southward. The substrate of these marshes is a deep soft mud with high amounts of organic debris. The regularly flooded marshes are flooded and drained by intertidal creeks which contain water rich in silt and organic matter.

Irregularly flooded marhses are flooded only by spring tides and wind tides. These marshes are found along the sound of North Carolina north of Cape Lookout. The substrate is firmer and the tidal creeks are straighter and shorter than those of southern marshes. The water in the tidal creeks is usually less rich in organic matter and silt. The dominant plant species vary in these two types of marshes.

Northern Coast:

Juncus roemerianus	Black needlerush
Distichlis spicata	Salt grass
Spartina patens	Saltmeadow cordgrass
Spartina alterniflora	Smooth cordgrass (narrow fringe)
Spartina cynosuroides	Giant cordgrass (levee areas)

Borrichia frutescens	Sea ox-eye
Salicornia spp.	Glasswort
Iva frutescens	Marsh elder

Southern Coast:

Spartina alterniflora	Smooth cordgrass
Spartina patens	Saltmeadow cordgrass
Juncus roemerianus	Black needlerush
Salicornia spp.	Glasswort
Iva frutescens	Marsh elder
Borrichia frutescens	Sea ox-eye
Aster tenuifoluis	Salt marsh aster
Baccharis halimifolia	Silverling
Limonium spp.	Sea lavender

Freshwater Coastal Marshes

Theses marshes border small ponds like the ones at Buxton Woods at Cape Hatteras, creeks and rivers upstream away from the influence of salinity and tides. Freshwater coastal marshes also border the Currituck Sound and eastern Albemarle Sound. The substrate is usually waterlogged with fresh to brackish water. More angiosperm plants are found here than in salt marshes.

Forbs:

Hibiscus moscheutos	Marsh hibiscus
Kosteletskya virginica	Marsh mallow
Pontederia cordata	Pickeral weed

Sagittaria ssp.	Arrowheads
Typha angustifolia	Narrow leaved cattail
Typha latifolia	Common cattail

Grasses:

Cladium jamaicense	Saw grass
Juncus spp.	Rushes
Phragmites communis	Reed
Scirpus spp.	Three-square bulrushes
Zizania aquatica	Wild rice

Gum--Cypress Swamp

These swamps are dominated by Nyssa (Gum) and Taxodium (Cypress) where water stands continuously even during droughts. The water level fluctuates between 1 to 2 feet below the surface to 1 to 4 feet above the surface. The Gum-Cypress forest is best developed on flood plains of the black water rivers in the southern coastal plain. The substrate is composed of a muck underlain by two to feet of gray silt on clay. The Cypress tree occurs in the wettest sites with the longest hydroperiod. Gum is more abundant on sites with shorter hydroperiods.

Trees:

Acer rubrum	Red maple
Ilex opaca	American holly
Liquidambar styraciflua	Sweet gum
Magnolia virginiana	Sweet bay
Nyssa aquatica	Tupelo gum

Persea borbonia	Red bay
Taxodium distichum	Bald cypress
Shrubs:	
Clethra alniflora	Sweet pepper bush
Cyrilla racemiflora	Ti-ti
Ilex coriacea	Swamp gallberry
Ilex galbra	Gallberry
Lyonia bucida	Tetter-bush
Myrica cerifera	Wax myrtles
Vines:	
Berchemia scandens	Rattan vine
Fern:	
Woodwardia virginica	Virginia chain-fern
Forb:	
Saururus cernuus	Lizard's tail

Hardwood River Swamp Forest

These forests occur along the major through-flowing coastal plain rivers and their tributaries. The forests are flooded only during heavy and extended rains in winter and early spring. These bottomland forests are found on fronts next to the river, on ridges back from the front and on flats between fronts and ridges. This forest is composed of a wide variety of hardwoods.

Trees:

Acer rubrum	Red maple
Betula nigra	River birch
Carya spp.	Hickory
Fraxinus spp.	Ash
Liquidambar styraciflua	Sweet gum
Magnolia virginiana	Sweet bay
Nyssa sylvatica	Black gum
Persea borbonia	Red bay
Platanus occidentalis	Sycamore
Populus heterophylla	Swamp cottonwood
Quercus falcata var. pagodaefolia	Cherrybark oak
Quercus nigra	Water oak
Quercus phellos	Willow oak
Taxodium distichum	Bald cypress
Ulmus americana	American elm

Pocosins

Pocosin in an indian word for "swamp on a hill." The word refers to a vegetative community consisting of a dense tangle of evergreen shrubs with scattered Pond pine. Pocosins develop on organic soil, usually peat. The pocosin communities occur in three situations: (1) on broad upland flats that are underlain by poorly drained soil; (2) in sandy depressions between sand ridges where the peat is shallow and (3) in and around Carolina Bays. Pocosins are influenced by fire and may have formed as a result of fire. Zenobia (Honey cup) and Pond pine dominate the low pocosin with conditions of long hydroperiods and frequent fire. If fire

is withheld, Cyrilla (Ti-ti) will dominate and form a Cyrilla--Pond pine community. On drier sites with short hydroperiods Arundinaria (cane) is dominate after fire. "High Bay" consists of Magnolia, Persea, Clethra and Gordonia is protected from fire.

Trees:	
Gordonia lasianthus	Loblolly pine
Magnolia virginiana	Sweet bay
Myssa sylvatica	Swamp gum
Persea borbonia	Red bay
Pinus serotina	Pond pine
Shrubs:	
Clethra alnifolia	Sweet pepper bush
Cassandra calyculta	Leather leaf
Cyrilla racemiflora	Ti-ti
Ilex coriacea	Swamp gallberry
Kalmia angustifolia	Sheep laurel
Lyonia lucida	Shrub
Lyonia mariana	Tetter bush
Mryica heterophylla	Bayberry
Zenobia pulverulanta	Honey-cup
Grass:	
Arundinaria gigantea	Cane
Vine:	
Smilax laurifolia	Bamboo brier

Magnolia virginiana	Sweet bay
Trees:	
Pinus palustris	Longleaf pine
Pinus serotina	Pond pine
Forbs:	
Aletris farinosa	Star-grass
Calapogon pulchellus	Calapogon orchid
Chaptalia	Sunbonnet
Cleistes divaricata	Rosebud orchid
Dionea muscipula	Venus fly-trap
Drosera spp.	Sundew
Habernaria spp.	Orchids
Pinguiclua spp.	Butterworts
Pogonia ophiglassoides	Rose-crested orchid
Rexia ssp.	Meadow beauty
Sarracenia flava	Yellow pitcher plant
Sarracenia purpurea	Purple pitcher plant
Sarracenia rubra	Sweet pitcher plant
Xyris spp.	Yellow-eyes grass
Viola spp.	Violets
Zigadenus densus	Fly-poison

Longleaf Pine - Turkey Oak - Wire Grass

This vegetation is often called the sandhill community and is found on deep, well-drained, coarse sand substrate. The community is very hot

during the summer because the light sand reflects much light. These areas have a very characteristic appearance, consisting of scattered, large Longleaf pines and a lower layer of scrub oaks. The ground is covered with hardy wiregrass, lichens and wildflowers. Fire is a strong influence in the community. Longleaf pines are fire resistant and the fire represses the hardwoods.

Trees:	
Carya pallida	Pale hickory
Pinus palustris	Longleaf pine
Quercus incana	Bluejack oak
Quercus laevis	Turkey oak
Quercus margaretta	Scrubby post oak
Quercus marilandica	Blackjack oak
Forb:	
Arenaria caroliniana	Sandhill chickweed
Asclepias humifusa	Sandhill milkweed
Baptisia perfoliata	False indigo
Euphorbia ipecacuanhae	Variable spurge
Galactia regularis	Milk pea
Lupinus spp.	Lupines
Polygonella polygama	Joint weed
Silphium spp.	Rosin weed
Stipulicida setacea	Wire plant
Grass:	
Aristida stricta	Wire grass

Fern:

Woodwardia virginica	Virginia chain-fern

Savanna and Pine Flatwoods

Savannas occur on mineral soil or substrates with little organic matter accumulation. A hard pan lies about 25 centimeters below the soil and is impervious to water and roots. These are areas of a continuous cover of grasses, scattered trees and shrubs. Savannas are strongly influenced by fire and are maintained by fire. Savannas occur in two situations: (1) the semi-bog or drier type savanna is found on gently sloping sand ridges where there is better lateral drainage and (2) the wetter bog-type savanna is found on poorly drained flatland often flooded during the wet season. Longleaf pine is the most common tree in both situations. Pond pine is more common on the wetter sites. Sweet bay and gallberry are the most common of the shrubs. Wire grass is common on sandy soils and orange grass is more common on the dry soils. Both habitats are rich in wild flowers including orchids and insectivorous plants.

Grasses:

Aristida stricta	Wire grass
Ctenium aromaticum	Orange or Toothache grass
Muhlengergia ssp.	Muhly grass
Rhynchospora ssp.	Beak rush

Shrubs:

Ilex glabra	Gallberry
Leiophyllum boxifolium	Sand myrtle

Lichen:	
Cladonia spp.	Lichens
Clubmoss:	
Selaginella acanthonota	Sandhill clubmoss
Cactus:	
Opuntia humifusa	Prickley pear
Forbs:	
Aletris farinosa	Star grass
Calapogon pulchellus	Calopogon orchid
Cleistes divaricata	Rosebud orchid
Dionea muscipula	Venus fly-trap
Drosera spp.	Sundew
Habenaria spp.	Orchids
Pinguicula spp.	Butterworts
Pogonia ophioglassoides	Rose-crested orchid
Polygola lutea	Red hot poker
Sarracenia flava	Yellow pitcher plant
Sarracenia purpurea	Purple pitcher plant
Sarracenia rubra	Sweet pitcher plant
Xyris spp.	Yellow-eyed grass
Zigadenus densus	Fly poison

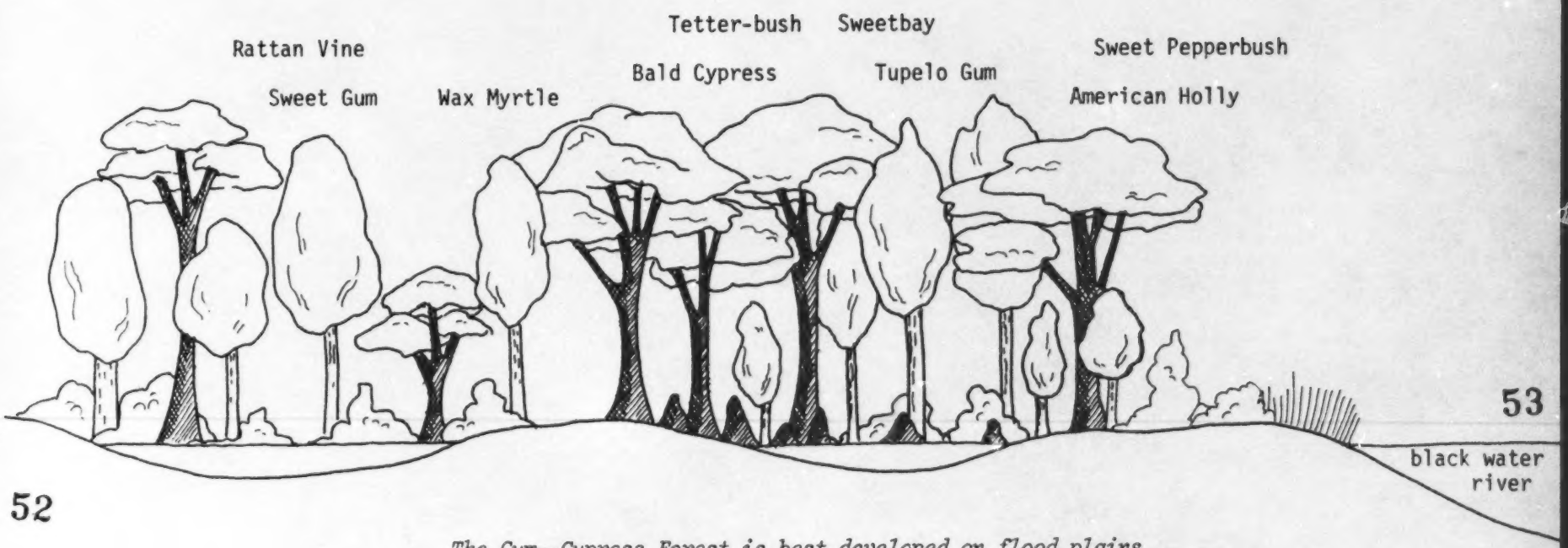
Upland Hardwood Forest

Once large well-drained areas of the coastal plains were dominated by oaks, hickories and pines. The oak-hickory forest has been largely cleared for agricultural purposes. The moist sites support Red maple, Sweetgum, Blackgum, American beech and tuliptrees. The drier sites are indicated by Turkey oak, Post oak, Blackjack oak and Loblolly pine.

Trees:

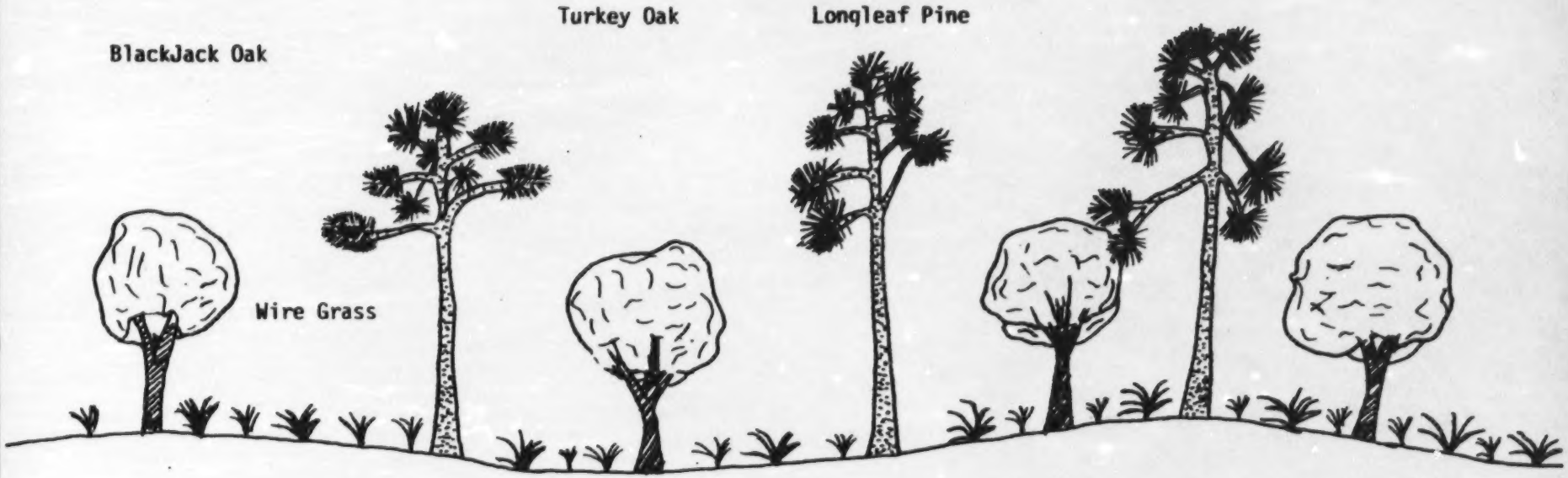
Carya tomentosa	Mockernut hickory
Cornus florida	Flowering dogwood
Fagus grandifolia	American beech
Liquidambar styraciflua	Sweet gum
Liriodendron tulipifera	Tulip poplar
Persea borbonia	Red bay
Pinus taeda	Loblolly pine
Quercus alba	White oak
Quercus falcata	Southern red oak
Quercus marilandica	Blackjack oak
Quercus michauxii	Swamp chestnut oak
Quercus nigra	Water oak
Quercus nigra	Water oak
Quercus phellos	Willow oak
Quercus stellata	Post oak
Quercus velutina	Black oak

GUM--CYPRESS FOREST

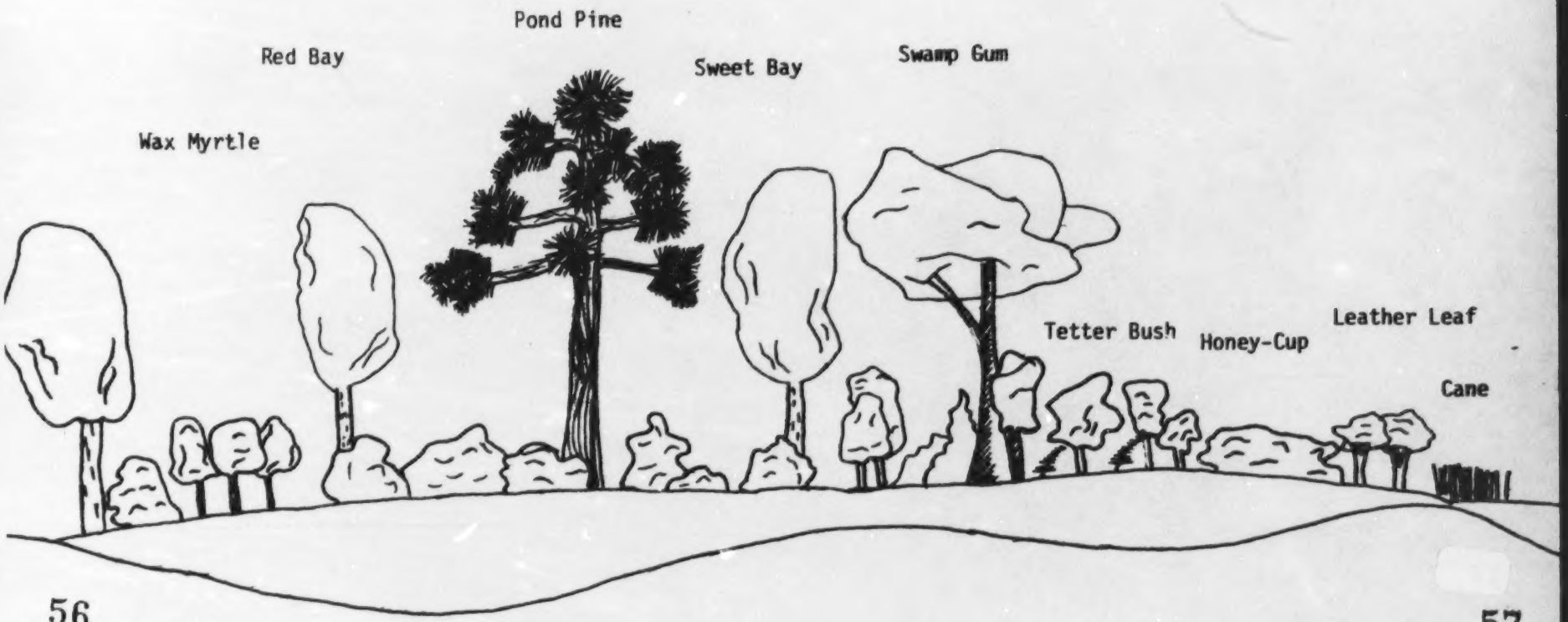


The Gum--Cypress Forest is best developed on flood plains of black water rivers in the southern coastal plain. Bald Cypress occur on the wetter sites and Tupelo Gum on drier sites.

Longleaf Pine-Turkey Oak-Wire Grass



Pocosin


Pond Pine
Red Bay
Sweet Bay
Swamp Gum
Wax Myrtle
Tetter Bush
Honey-Cup
Leather Leaf
Cane

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